

# ***HABITAT CONDITIONS***

## **Channel Alterations**

Channelization and levee construction are considered legitimate stream management practices by many landowners. Channelization includes straightening natural stream meanders, clearing the banks, and widening and deepening the channel (Funk and Ruhr 1971). This results in a loss of stream habitat, increased bank erosion, and lower ground water levels (Funk and Ruhr 1971). Levee construction separates the stream from its floodplain. Flood water can no longer spread out and is concentrated within the channel causing further streambank erosion.

Several streams within the basin have been channelized for over one-half their length. A substantial portion of the streams in the basin are confined by levees.

The USDA-NRCS (MO) (IA) has determined that much of the downcutting in the basin due to channelization has been completed and filling of the main channel is now occurring. Any flood control benefits due to channelization in the 1920's is rapidly diminishing due to in-channel sedimentation (USDA-SCS 1982).

Anecdotal evidence suggests that lateral erosion rates of streams within the basin have probably always been high. Channel alterations have increased the amount of bedload being carried by streams and have intensified these changes so that erosion rates of more than 50 feet in a single event are not uncommon. A good example of the dynamic nature of these streams is the recent chute cutoff of the Grand River channel at Elam Bend CA (Gentry County, MO). Grand River shifted more than five hundred feet during a high water event in 1991. This also occurred upstream of the area at two other locations. It is unclear whether this phenomenon is isolated or a basin wide phenomenon.

## **Unique Habitat**

Fish habitat throughout much of the Grand River Basin has been degraded. Much of the unique habitat consists of streams that have not been channelized or contain coarse substrate and bedrock.

Unique habitat was identified by searching MDC fisheries files, publications and through interviews with MDC Protection Division and Iowa Fisheries Division personnel.

Unique areas worthy of special attention follow:

**Grand River** from the mouth to river mile 35 is the largest prairie river in Missouri that is relatively unaffected by impoundments or channelization (Kramer 1991). Forty-seven species of fish including rare and unusual species have been collected in the lower Grand River.

**Marrowbone Creek** (5th order; Daviess County) is one of the least disturbed tributaries in the upper Grand River drainage. This stream has a relatively undisturbed riparian corridor at most localities (Kramer 1991). Marrowbone Creek was the only northwest Missouri stream included in the proposed

Natural Streams Act.

**Sugar Creek** (6th order; Harrison County) is relatively unchannelized for most of its length. The stream is characterized by bedrock outcroppings. Sugar Creek and Tombstone Creek (a major tributary) contain Topeka shiners (*Notropis topeka*), a federally listed endangered species. Sugar Creek supports a high quality channel catfish population.

**Thompson River** (River Mile 58-88.5; Harrison County, MO and Decatur County, Iowa) is relatively unchannelized. It is characterized by occasional bedrock outcroppings. Iowa DNR personnel have collected trout-perch (*Percopsis omiscomaycus*), johnny darters (*Etheostoma nigrum*), and sauger (*Stizostedion canadense*) from this reach.

**Chloe Lowry Marsh** (Mercer County) is a 40-acre wetland in the Weldon River flood plain. The marsh has been described as one of the best natural marshes remaining in Missouri (Gremaud 1987, 1993). The marsh is too shallow to support fish. The marsh contains a population of northern leopard frogs (*Rana pipiens*) and rare plants. This area is designated as a state natural area.

**Shoal Creek** (6th order; Caldwell County) is largely unchannelized throughout most of its length. One half mile of Shoal Creek in the Bonanza C.A. has been designated as an outstanding state water resource. Crabapple Creek is a high quality tributary to Shoal Creek. One mile of Crabapple Creek has been designated as an outstanding state water resource.

**Grindstone Creek** (7th order; Daviess and DeKalb counties) is relatively unaltered and contains gravel substrate. The stream contains trout-perch and a high quality catfish population. Grindstone Creek is one of the few streams in northern Missouri that flows north. The majority of the corridor is tree-lined (Pemberton 1982). The stream also supports a relatively diverse mussel population (A. Buchanan, MDC, personal communication).

**East and West Forks of Big Creek** (Harrison County) are considered exceptional examples of creeks in the prairie region (Gremaud 1987).

**Locust Creek** has two largely unchannelized reaches. One was recognized by the National Park Service in the 1982 Nationwide Rivers Inventory and has both state and national significance. This reach is a "unique riffle-pool arrangement and maintains one of the last largely unchannelized, undisturbed landform features in northern Missouri exhibiting oxbow lakes, meanders, unimpeded flooding typical of natural prairie streams, one of the best examples of aquatic community types in the region and diverse fish types including the unique stone cat". The second reach has well-established wooded corridors, abundant instream cover and unique fish species including trout-perch.

## Improvement Projects

There have been numerous attempts throughout the Grand River Basin to stabilize eroding banks. These attempts range from ineffective measures such as further channelization and tire revetments to rock projects that have been professionally engineered.

Projects known to MDC fisheries management personnel have been outlined in Table 8. Most projects have been installed to stabilize streambanks.

A large rock project has been installed to improve fish habitat at MDC's Newman Memorial Access along Grand River (T.59N, R.26W, S32) in Daviess County. The MDC has an experimental area on the Locust Creek C.A. where various streambank stabilization and habitat improvement projects are being evaluated.

### **Stream Habitat Assessment**

Stream habitat was evaluated using the Stream Habitat Assessment Device (SHAD). Habitat assessments were completed at 23 locations throughout the basin (Figure hb).

The homogenous nature of streams throughout the basin allows generalizations to be made regarding much of the stream habitat.

### **Streambanks:**

Streambanks along most of the reaches are highly susceptible to erosion. Channels are often incised so deeply that streamside vegetation offers little erosion protection and the establishment of streambank vegetation often is limited to herbaceous, viney plants with shallow root systems. Many streambanks are taller than 15 feet and are eroding at a rapid rate. Lateral erosion rates of 15-30 feet annually are not uncommon on larger streams (>4th order). Free access to cattle contributes to streambank instability on many smaller streams throughout the basin.

### **Stream Corridor:**

Most streams throughout the basin have little or no corridor. Often the corridor consists of a narrow band (10-20 feet) of mature hardwoods, willows, or herbaceous vegetation such as giant ragweed (*Ambrosia trifida*) or horsetail (*Equisetum* sp.). Due to excessive downcutting of stream channels, many areas of the larger streams have corridors only one or two trees wide. Many of these streams are undercutting the trees causing them to fall into the stream. Should this trend continue, there will be long reaches without large streamside trees.

### **Stream Corridor Land Use:**

Much of the flood plain is in row crop production. Often crops are planted to the edge of the streambank. Some timber harvest does take place along streams. A narrow strip of trees along a stream is often the only timbered area on a farm.

### **Channel Conditions:**

Stream channels are filling in with sediment throughout much of the basin. However, it depends on the location. The bottom of Grand River at Sumner has risen approximately 6 feet (629.5' to 635.5' m.s.l.) in the last 40 years. During the same period the bottom of Grand River at Gallatin

has lowered 2 feet (USDA-SCS 1982).

Most sites were characterized by less than desirable pool depth. Loss of quality pool habitat is the most serious factor affecting stream fish populations throughout the Grand River Basin. Pool depth in smaller streams (1st-3rd order) is typically less than 2 feet. Pools in moderate sized streams (4th and 5th order) typically are less than 3 feet. Larger streams (6th order) typically have pool depths of less than 5 feet. Grand River (8th order) has extensive areas of shallow water, however, pools deeper than 10 feet are common below Sumner.

Woody structure is the most common fish cover type. Trees falling into streams due to bank erosion provide important instream habitat.

### **Streambed Condition:**

Soil parent materials vary within the basin and ultimately determine the predominant stream substrate type. Thinly glaciated or unglaciated areas within the basin such as those around Poosey Conservation Area have soils that are formed from the weathering of native rock (Bob Wilson, USDA-SCS, personal communication). Streams in this area have a lot of energy and are downcutting into an underlying residuum of limestone or shale. The alluvial material in the narrow floodplains contains large amounts of rocks imbedded with silt or clay. Streams such as Gee's, Indian and Bachelor creeks have predominantly cobble and bedrock substrates.

Much of the basin, however, has soils that are glacial-fluvial in origin. Streams in this area meander through floodplains that are predominantly sand, silt, and clay. Soils closest to the streams are sandier and better drained. Soils farthest from the streams contain more clay and are more poorly drained (Bob Wilson, USDA-SCS, personal communication). Streams in this region such as Grand River, Thompson River, Weldon River and Medicine Creek have sandy substrates.

Table 8. Streambank restoration and habitat improvement projects in the Grand River Basin, Missouri.

<b>Stream</b>	<b>County</b>	<b>Practice</b>	<b>Entity</b>
Shoal Creek	Clinton	Tree revetment	Private
W.F. Grand River	Gentry	Rock blanket	County
W.F. Grand River*	Gentry	Tire revetment	County
W.F. Grand River	Worth	Rock blanket	County
Thompson River	Grundy	Piling fence	Private
Thompson River	Harrison	Piling fence	Private
Marrowbone Creek	Daviess	Piling dikes	Private
Weldon River	Mercer	Rock jetties	County
Honey Creek	Grundy	Gradient control	Private
Honey Creek Trib.	Grundy	Gradient control	Private
Shoal Creek Trib.	Clinton	Rootwads	Private
Locust Creek C.A.	Sullivan	Various	MDC

\*Project failed. A rock project is in the planning phase.

